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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/727,746

12/03/2003

Heng Liu

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8880

32605

7590

10/06/2008

MACPHERSON KWOK CHEN & HEID LLP

2033 GATEWAY PLACE

SUITE 400

SAN JOSE, CA 95110

EXAMINER

KACKAR, RAM N

ART UNIT

PAPER NUMBER

1792

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/727,746	<b>Applicant(s)</b> LIU, HENG	
	<b>Examiner</b> Ram N. Kackar	<b>Art Unit</b> 1792	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 August 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 16-17, 63-87, 89-103 and 131-132 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16, 17, 63-87, 89-103, 131 and 132 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8/22/2008 has been entered.

### ***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 63-87 and 89-103 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. In this instance the new amendment "wherein the wafer carrier and the chamber cooperate to define a generally flat, continuous and unobstructed flow channel" is a new matter.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 63-87 and 89-103 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In this case the scope of limitation “wherein the wafer carrier and the chamber cooperate to define a generally flat, continuous and unobstructed flow channel” is indefinite since it does not point to a definite method or structure except that the outlet of gas is above the upper surface of the wafer carrier.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

**7. Claims 16-17 and 131-132 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Tabata et al (US 2003/0133854).**

Tabata et al disclose a plurality of small chambers for chemical vapor deposition (Fig 2 501, 502 and 503) connected to common gas supply through flow controllers 611-613 and common exhaust 71.

**8. Claims 63-67, 71-75, 78-84, 87, 89 -93 and 96 rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Jurgensen et al (WO 02/18672).**

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) to process a plurality of substrates sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), induction (high frequency) heater outside the chamber (19) to heat the carrier, gas inlet located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier (23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13). Sealing is by the diffusion ring (14). Jurgensen et al further disclose that the diffusion ring is made in the same way as support plate, tension plate, carrier plate and cover plate (para. 16) which are shown to be made of graphite with SiC coating.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**10. Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hirooka et al (US 4798166) in view of Maeda et al (US 5281295).**

Hirooka et al disclose a plurality of small deposition chambers (Fig 1 A, B, C) connected to common gas supply (Fig 1 for example 101 and 102). Hirooka et al do not explicitly disclose flow controllers for each chamber.

Maeda et al disclose one common gas supply distributed to plurality of process stations through flow controllers (Abstract and Fig 1 20a-20e).

**11. Claims 63-87, 89-93 and 96 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Ikeda et al (JP 62211914).**

Jurgensen et al disclose a CVD coating device having a rotatable wafer carrier (Fig 1 and paragraph 7) to process a plurality of substrates (*disclosed number is 5*) sealed at a periphery to facilitate laminar flow (Fig 1), bottom of the chamber defined by the carrier (Fig 1-3), induction (high frequency) heater outside the chamber (19) to heat the carrier, gas inlet located centrally (26) and gas outlets above the carrier (25), a shaft for rotating the wafer carrier (23), a small distance from carrier to the cover (Fig 1) and a graphite discharge ring (Col 1 lines 8-13). Sealing is by diffusion ring which works both as a seal ring and diffusion ring (14). Jurgensen et al further disclose that the diffusion ring is made in the same way as support plate, tension plate, carrier plate and cover plate (para. 16) which are shown to be made of graphite with SiC coating.

Regarding the distance between the wafer carrier and top of the chamber, diameter of the gas inlet and speed of rotation of the carrier, these are result effective parameters and their optimization would be obvious for one of ordinary skill in the art at the time of invention.

Jurgensen et al disclose discharge ring for allowing gases to pass symmetrically over the substrate but do not disclose that the outlets through a hollow ring to collect for disposal.

Ikeda et al disclose a diffuser, which is a hollow ring with plurality of inlets and outlets (Fig 2 B and C).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use a hollow ring to guide exhaust gases out of the chamber in order to have an orderly and laminar removal of exhaust gases.

**12. Claims 94-95 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of MacLeish et al (US 6113984).**

Jurgensen et al disclose inductive heating which is equivalent to radiation heating.

MacLeish et al disclose a CVD coating device having a rotatable wafer carrier (Fig 14-116, Fig 1-48) sealed at a periphery to facilitate laminar flow (Abstract, Fig 14-130 and Col 14 lines 55-59), bottom of the chamber defined by the carrier (Fig 14-115, Fig 1-50), heater outside the chamber (Fig 2-44 and Fig 14-124) to heat the carrier, a shaft for rotating the wafer carrier (Fig 14-116, Fig 1-48) and a small distance from carrier to top (Fig 14-106, Fig 1-34a)

Regarding claim 95 MacLeish discloses purge of the area outside of reaction chamber 34a (Col 9 lines 53-60).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to use radiant heating instead of inductive heating as being equivalent.

**13. Claims 97-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Van de Walle et al (20020054745).**

Jurgensen et al do not disclose using alkyl and ammonia gas and do not teach the possibility of parasitic pre-reaction between the two.

Van de Walle et al disclose an MOCVD coating device having a rotatable wafer carrier (Fig 17 and paragraph 49) to process substrates using alkyl gas like trimethylaluminum and ammonia (Paragraph 38 and 49) and teach that to prevent pre-reaction between alkyl gas and ammonia gases are introduced in the chamber separately- ammonia from inlet 1720 and alkyl gas from 1710 (Paragraph 49) to reduce requirement of carrier gas like Hydrogen.

Therefore keeping alkyl gas and ammonia separate until needed for deposition reaction would have been obvious for one of ordinary skill in the art at the time of invention.

**14. Claims 97-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jurgensen et al (WO 02/18672 or US 2003/0221624) in view of Van de Walle et al (20020054745) and further in view of Hirooka (US 4812331).**

Jurgensen et al in view of Van de Walle et al disclose keeping alkyl gas and ammonia separate and disclose a structure for doing that but not as explicit as claimed.

Hirooka et al disclose a deposition system having multiple gas inlets separated from each other and concentric to each other (Fig 1) and disclose several ways of connecting gas supplies before entering the chamber (Fig 1) which includes pre-mixing as well as mixing only at the entrance of the chamber through concentric tubes (a, b, c).



Therefore connecting inlets separately as in Hirooka et al so as to prevent parasitic pre-reaction would be obvious to one of ordinary skill in the art at the time of invention.

### ***Response to Arguments***

Applicant's arguments filed 8/22/2008 have been fully considered but they are not persuasive.

Applicant's arguments regarding Tabata are not relevant to the issue. Applicant's arguments against Jurgensen are not persuasive since the flow is flat, continuous and unobstructed. Further applicants arguments against Maeda et al are not relevant to the claim limitations. Addition facilities in Maeda do not have to be used and do not prevent from using the apparatus as claimed.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ram N. Kackar whose telephone number is 571 272 1436. The examiner can normally be reached on M-F 8:00 A.M to 5:P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571 272 1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Ram N Kackar/  
Primary Examiner, Art Unit 1792